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Kimura

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(54) **RECORDING MATERIAL PROCESSING APPARATUS AND IMAGE FORMING SYSTEM**

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B65H 29/14	(2006.01)
G03G 15/00	(2006.01)

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CPC ***B65H 29/125*** (2013.01); ***B31F 5/001*** (2013.01); ***B42C 1/12*** (2013.01); ***B65H 29/14*** (2013.01); ***B65H 31/30*** (2013.01); ***B65H 37/04*** (2013.01); ***B65H 39/00*** (2013.01); ***G03G 15/6541*** (2013.01); *B65H 2301/4212* (2013.01); *B65H 2301/4213* (2013.01); *B65H 2301/42146* (2013.01); *B65H 2402/441* (2013.01); *B65H 2403/942* (2013.01); *B65H 2404/166* (2013.01); *B65H 2404/632* (2013.01); *B65H 2601/11* (2013.01); *B65H 2801/27* (2013.01)

(58) **Field of Classification Search**

CPC B65H 37/04; B65H 31/30; B65H 39/00; B42C 1/12; B31F 5/001

USPC 270/58.07, 58.08, 37; 399/407, 408, 399/410

See application file for complete search history.

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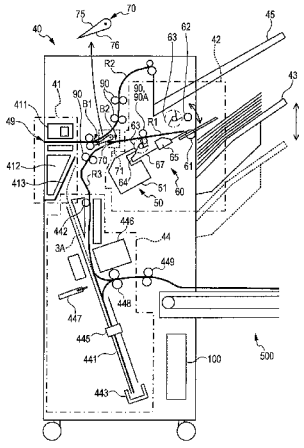
(74) *Attorney, Agent, or Firm* — Oliff PLC

(57) **ABSTRACT**

A recording-material processing apparatus includes a biding mechanism that moves along a predetermined movement path and binds a recording material stack; a recording-material transport path along which the recording material is transported, the recording-material transport path extending from a first area to a second area, which are next to each other with the movement path therebetween, and extending beside the movement path; a first transport member that is provided in the first area, at a position away from the portion of the recording-material transport path extending beside the movement path, to transport the recording material on the recording-material transport path to the second area; and a second transport member that is provided in the second area, at a position away from the portion of the recording-material transport path extending beside the movement path, to transport the recording material transported by the first transport member to the further downstream side.

4 Claims, 14 Drawing Sheets



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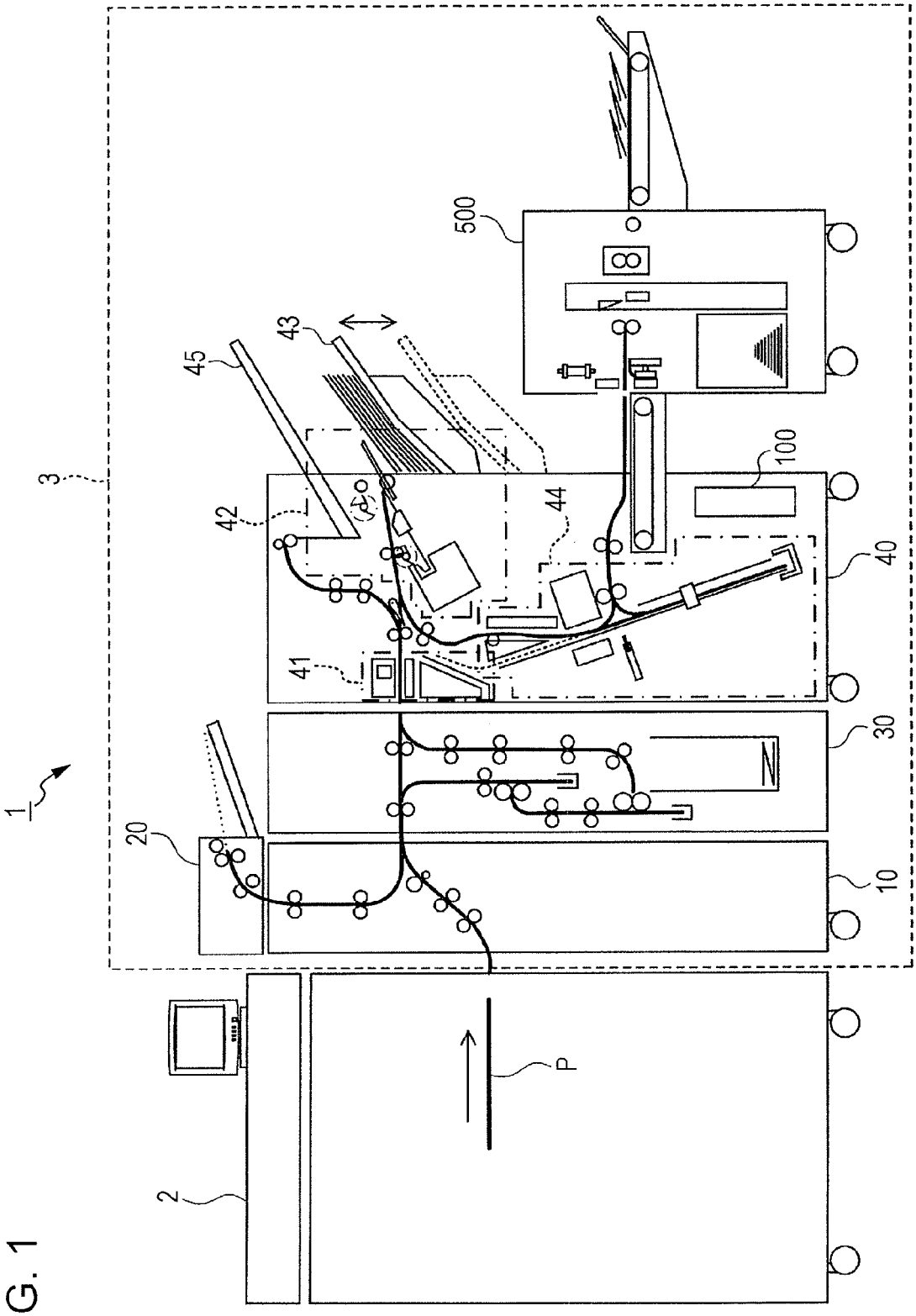


FIG. 1

FIG. 2

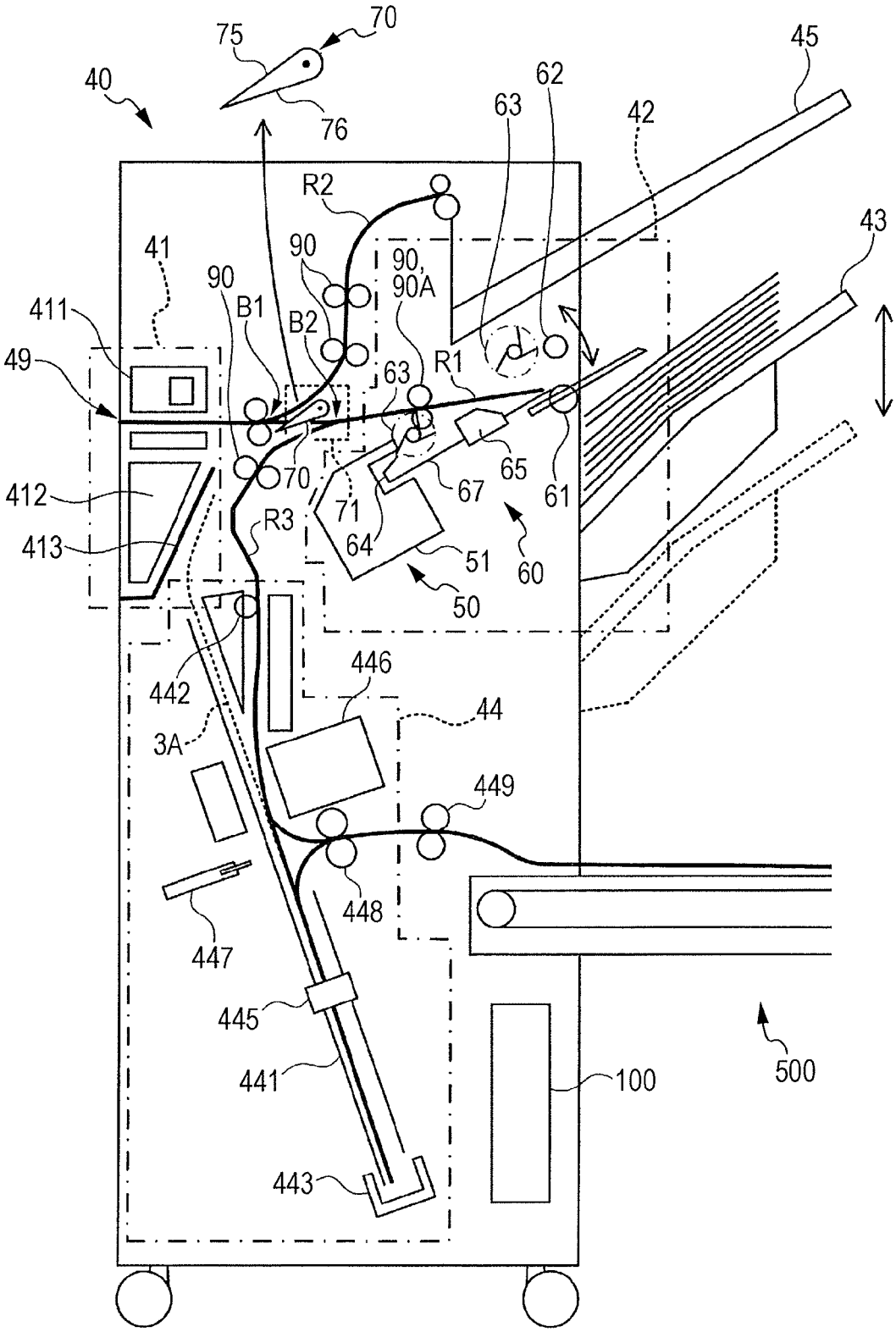

70
75
40
76
62
63
45
42
R2
41
90
90,
90A
43
411
90
B1
B2
49
63
R1
65
61
70
67
412
71
R3
64
51
60
413
50
442
446
44
3A
449
448
447
445
441
100
500
443

FIG. 3

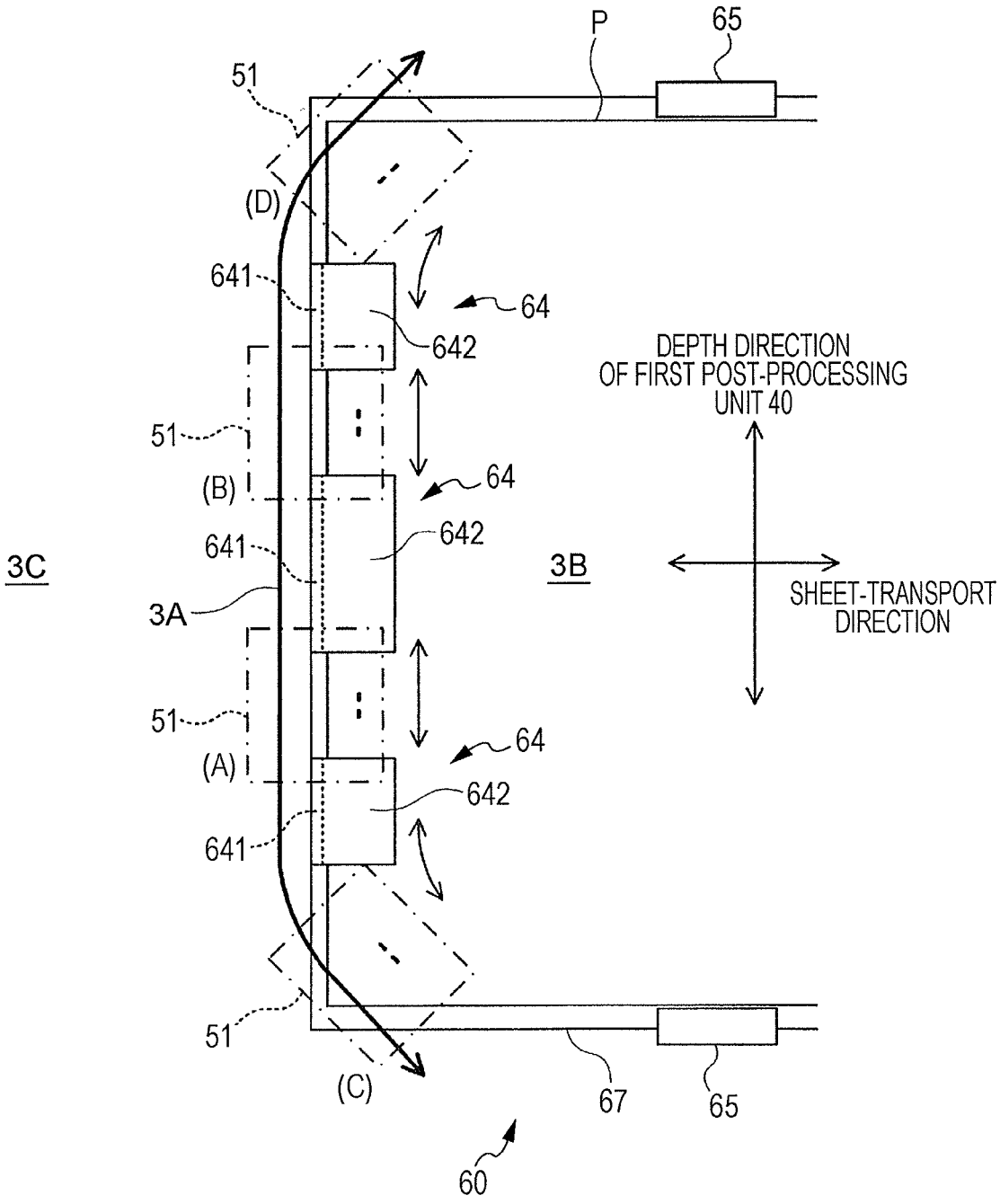

P
65
51
(D)
641
64
642
DEPTH DIRECTION
OF FIRST POST-PROCESSING
UNIT 40
51
(B)
64
642
3C
641
3B
3A
SHEET-TRANSPORT
DIRECTION
51
64
(A)
642
641
51
(C)
67
65
60

FIG. 4

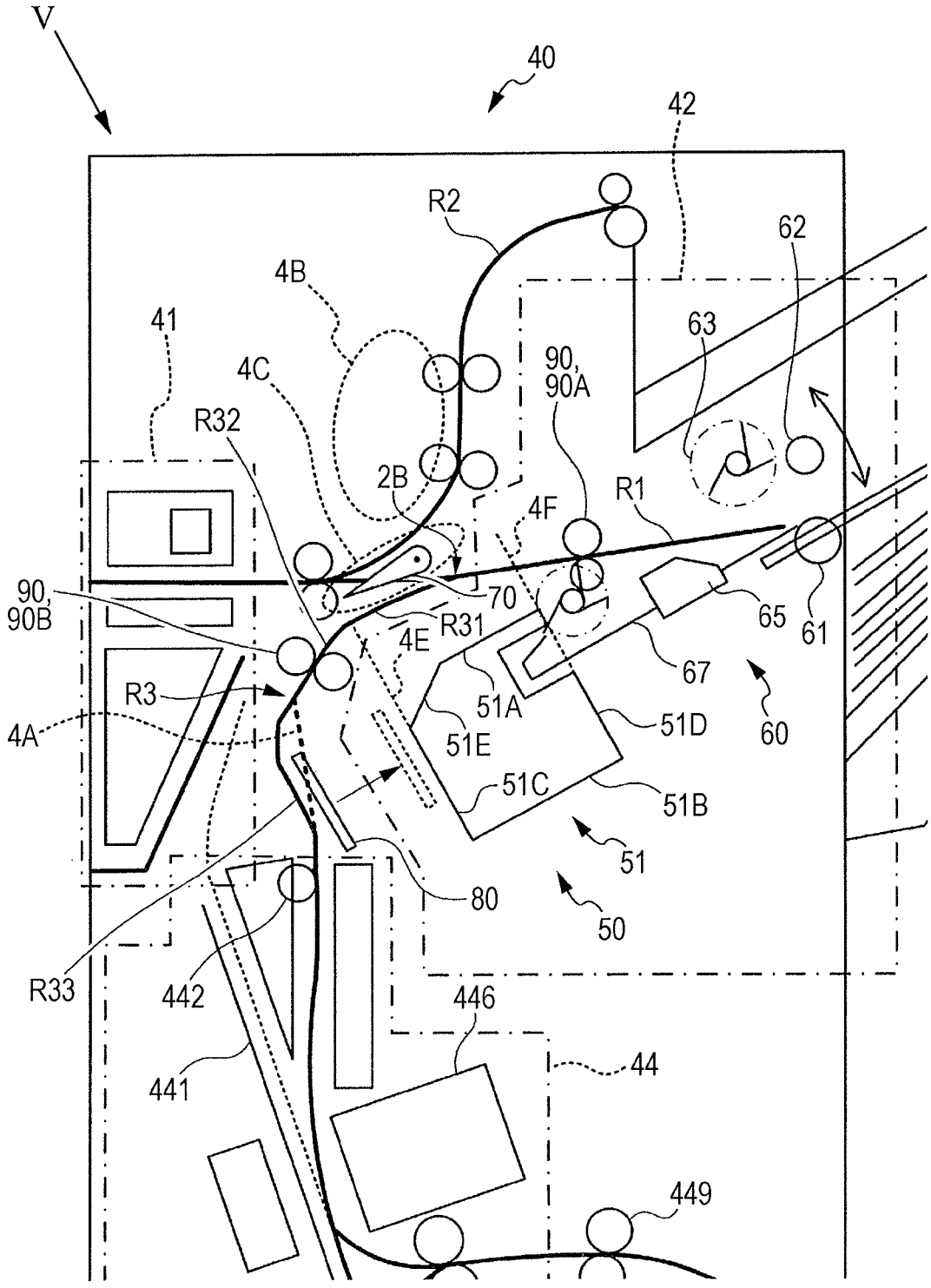

V
40
42
R2
62
4B
41
63
4C
90,
90A
R32
2B
4F
R1
90,
90B
70
65
61
R31
4E
67
R3
51A
51D
60
4A
51E
51C
51B
51
80
50
R33
442
446
441
44
449

FIG. 5

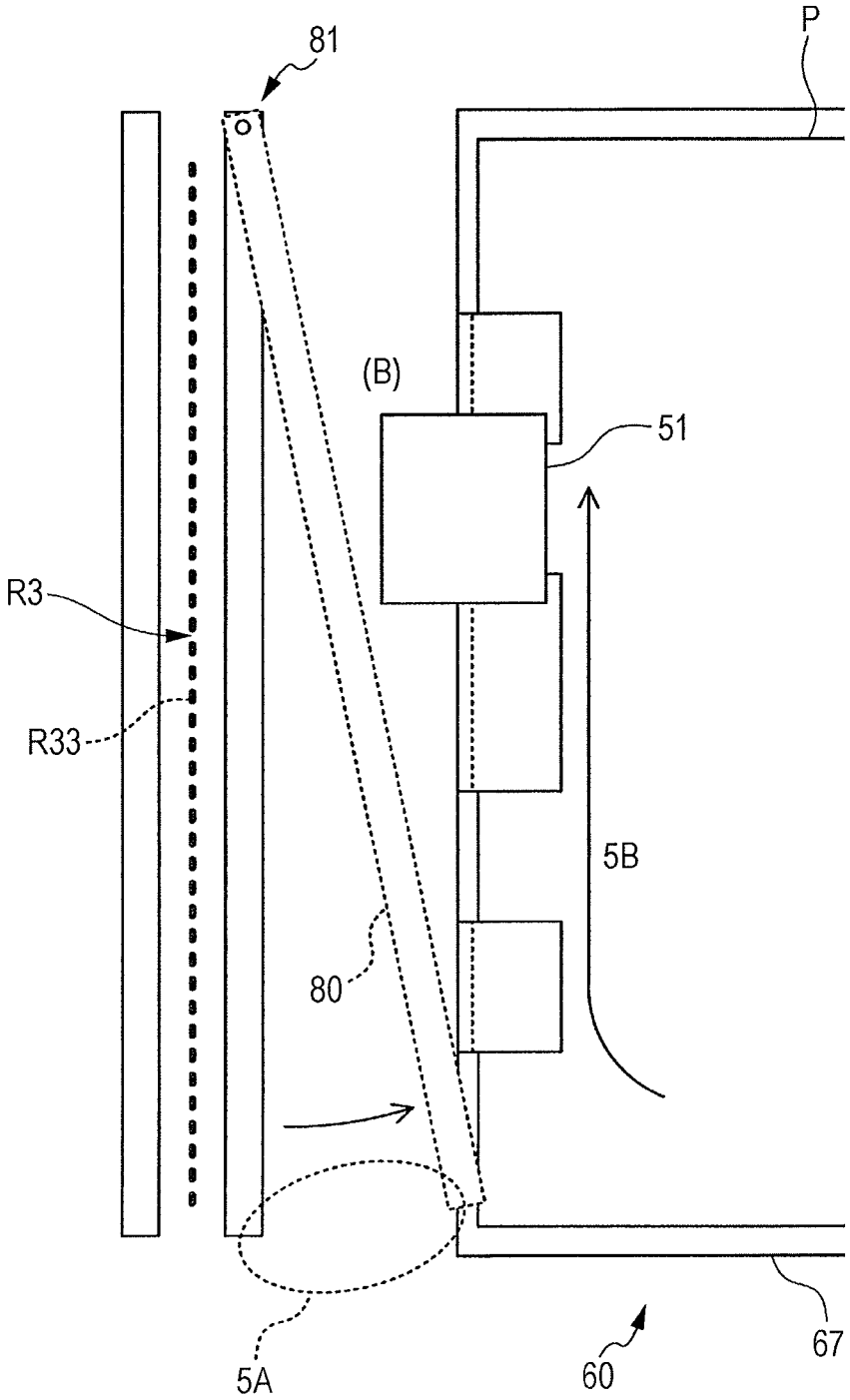


FIG. 6

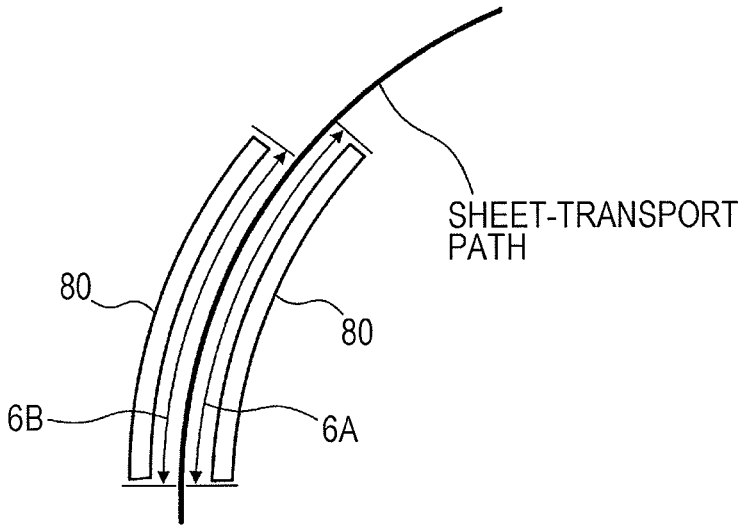


FIG. 7

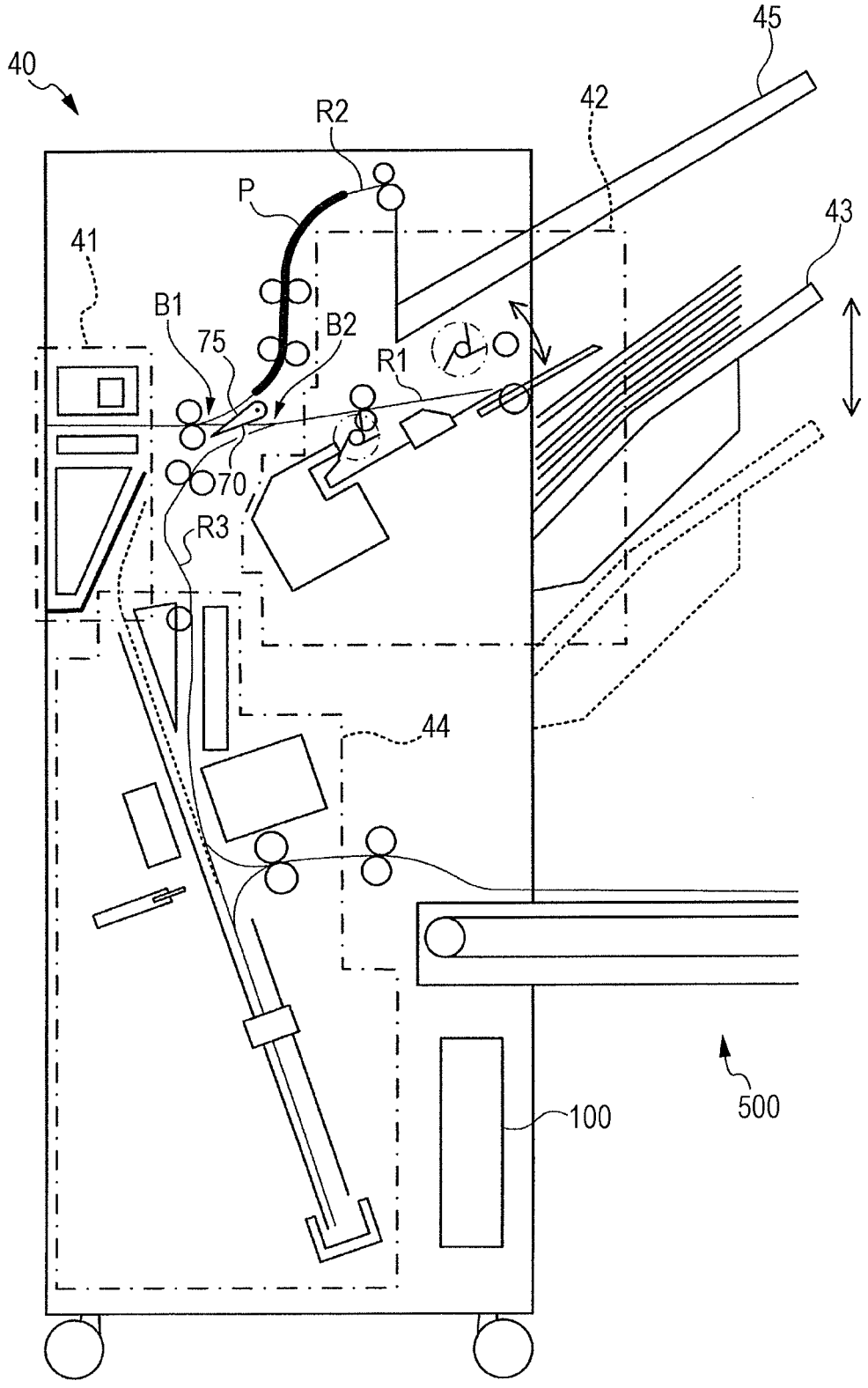


FIG. 8

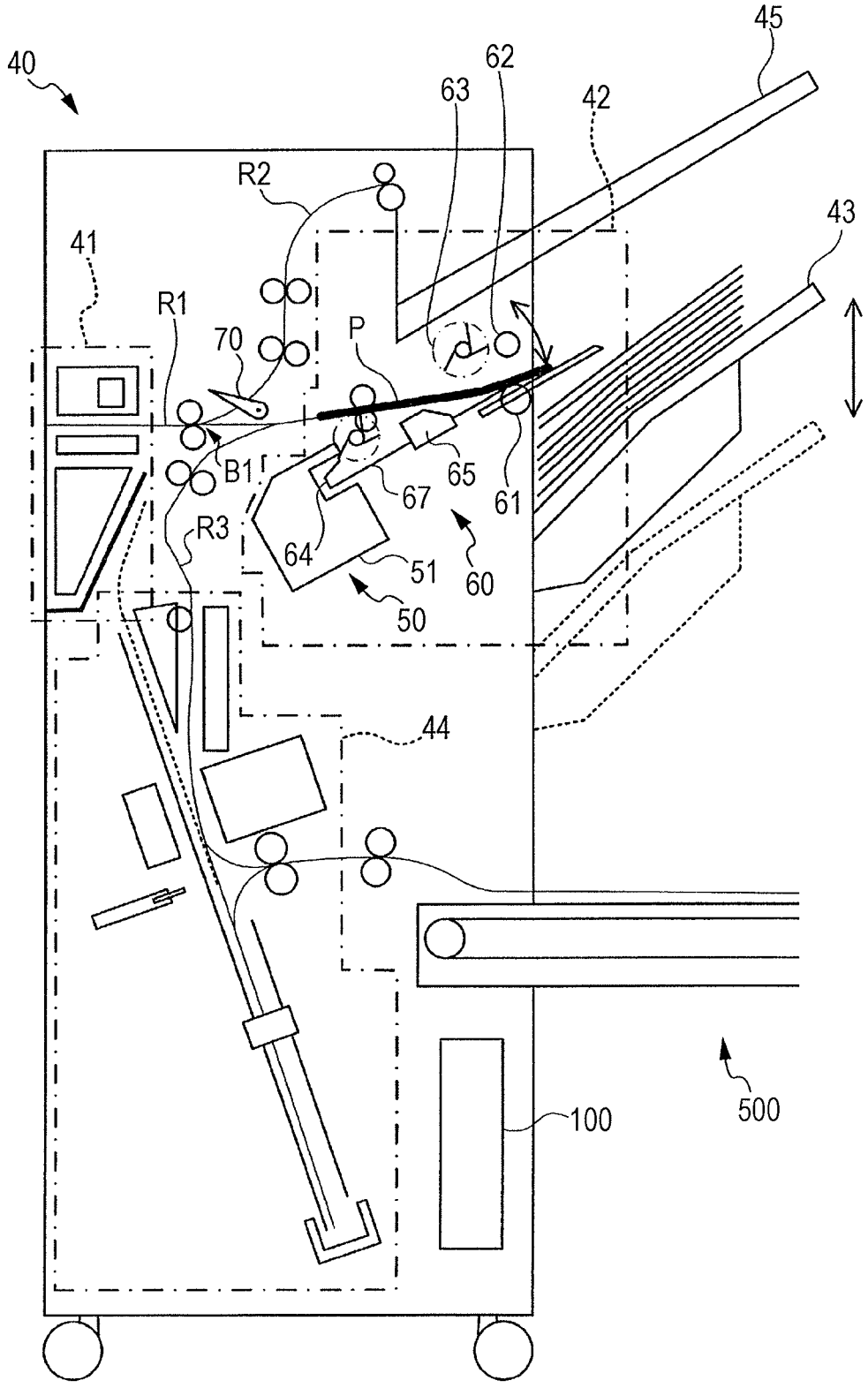


FIG. 9

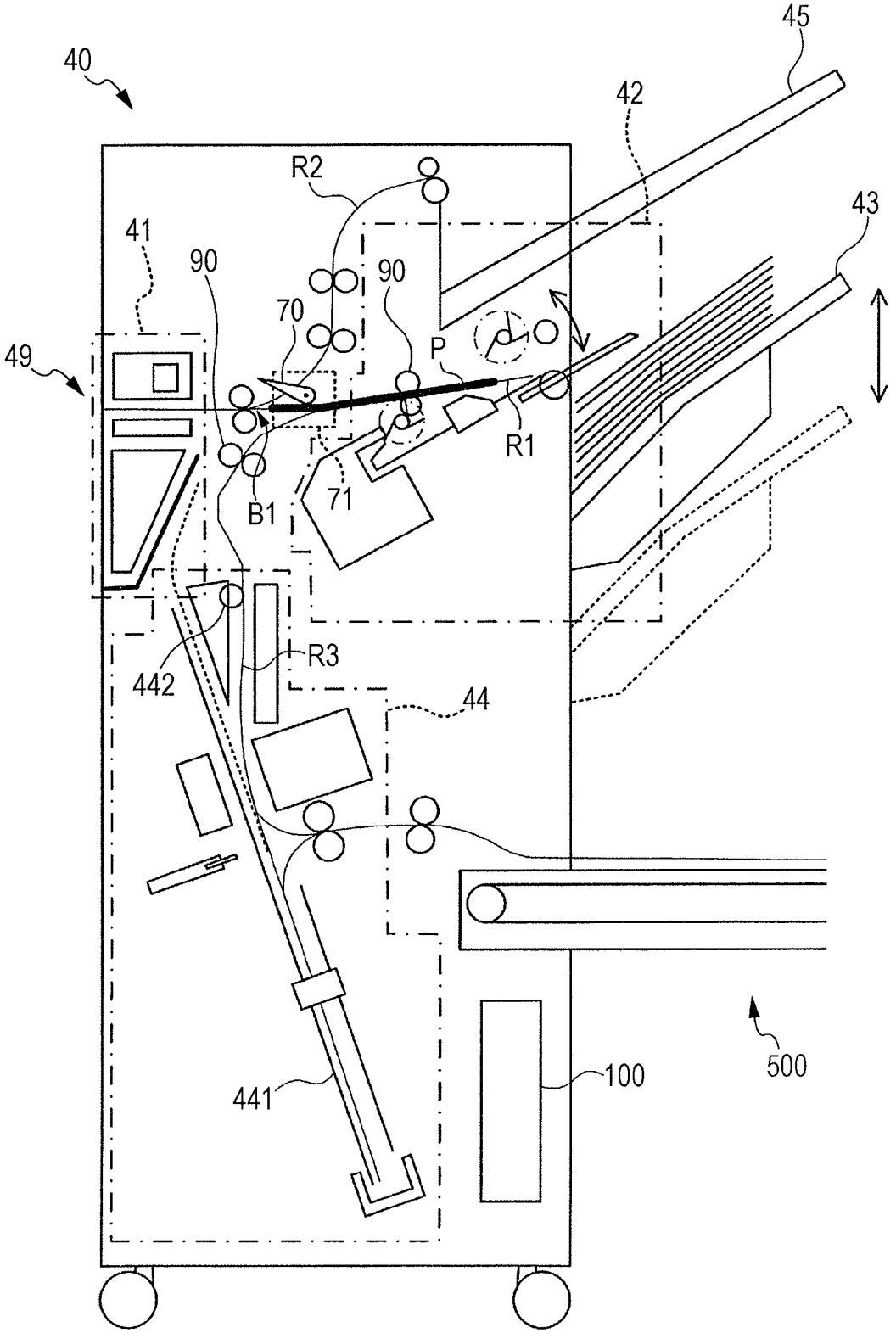


FIG. 10

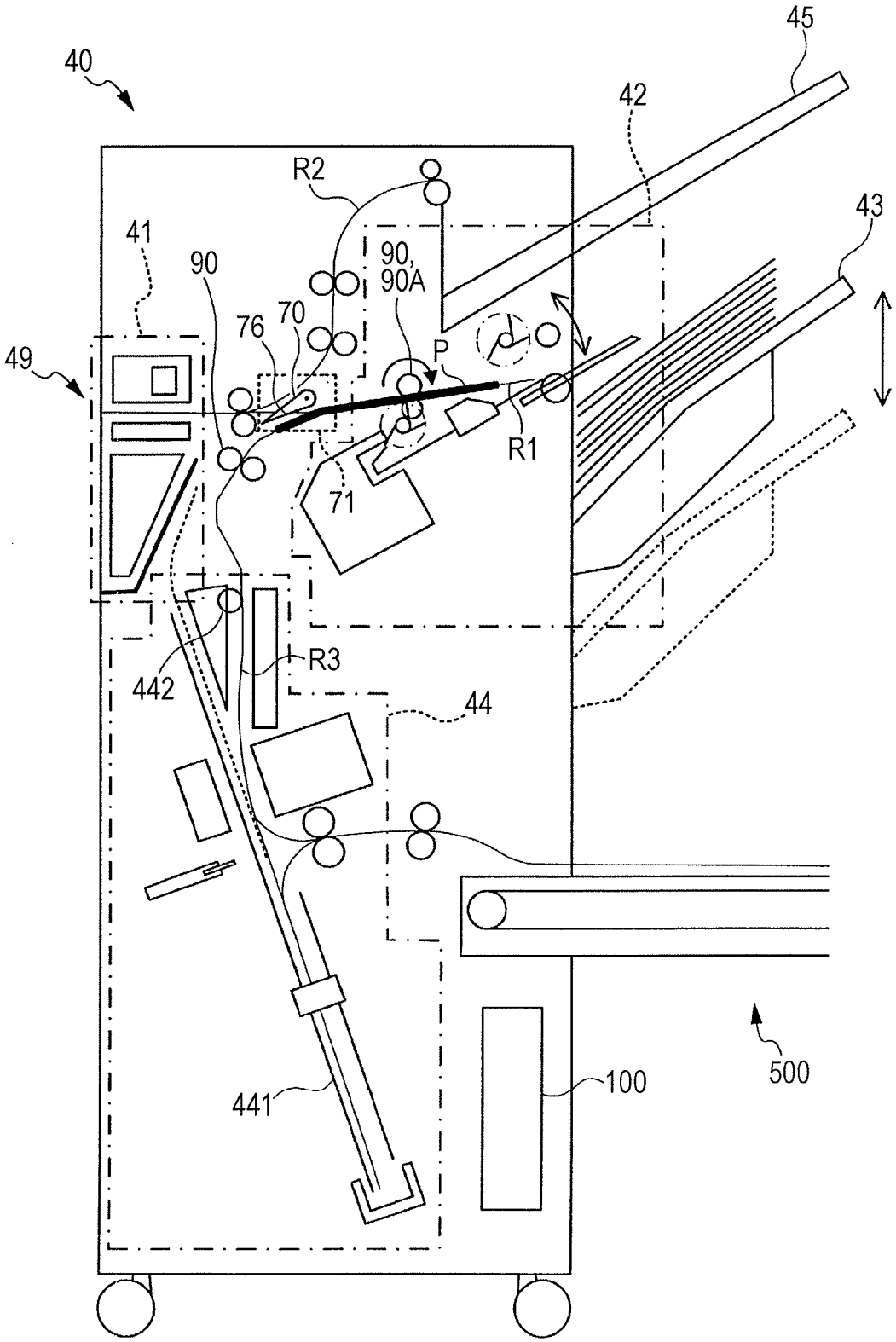


FIG. 11

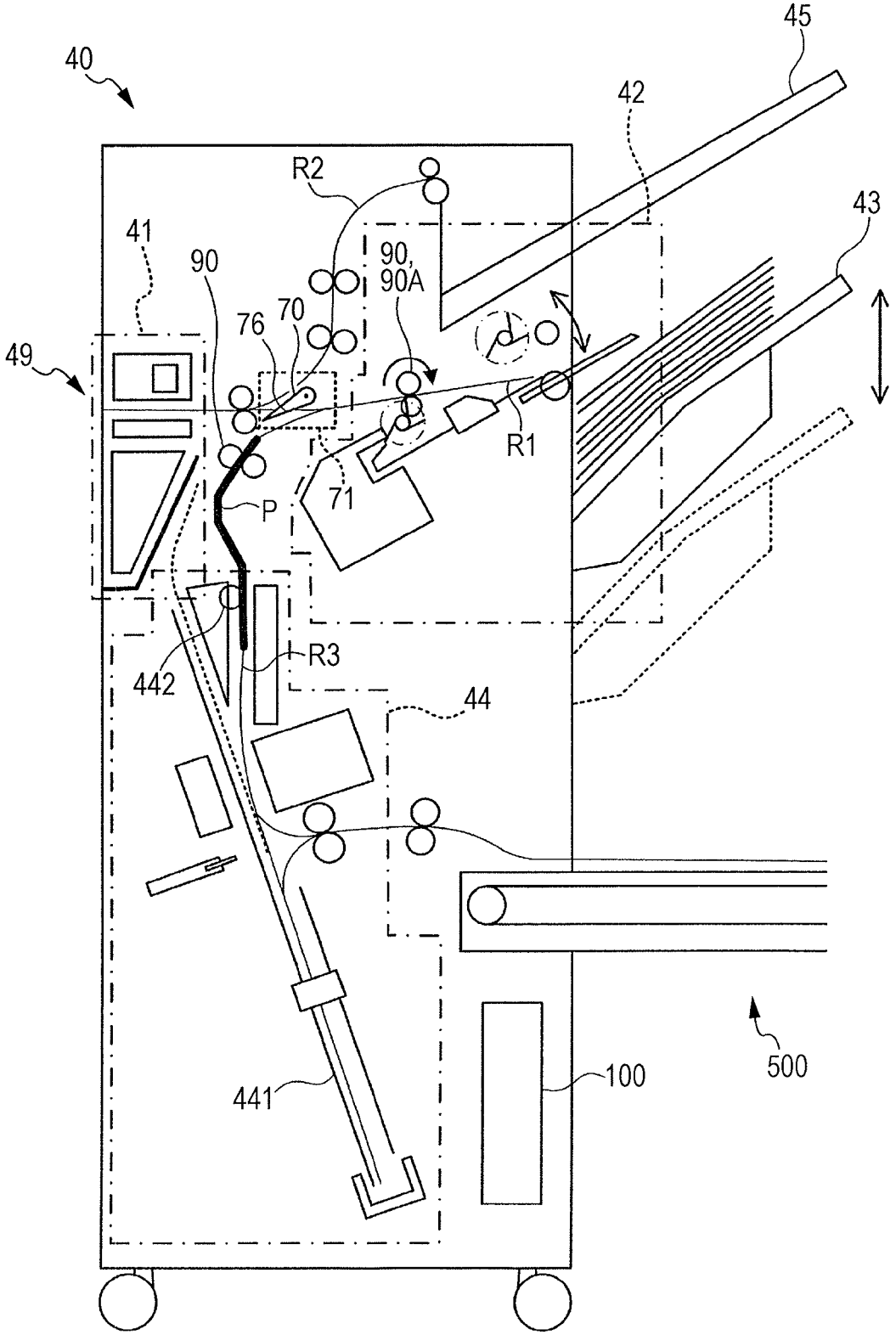


FIG. 12

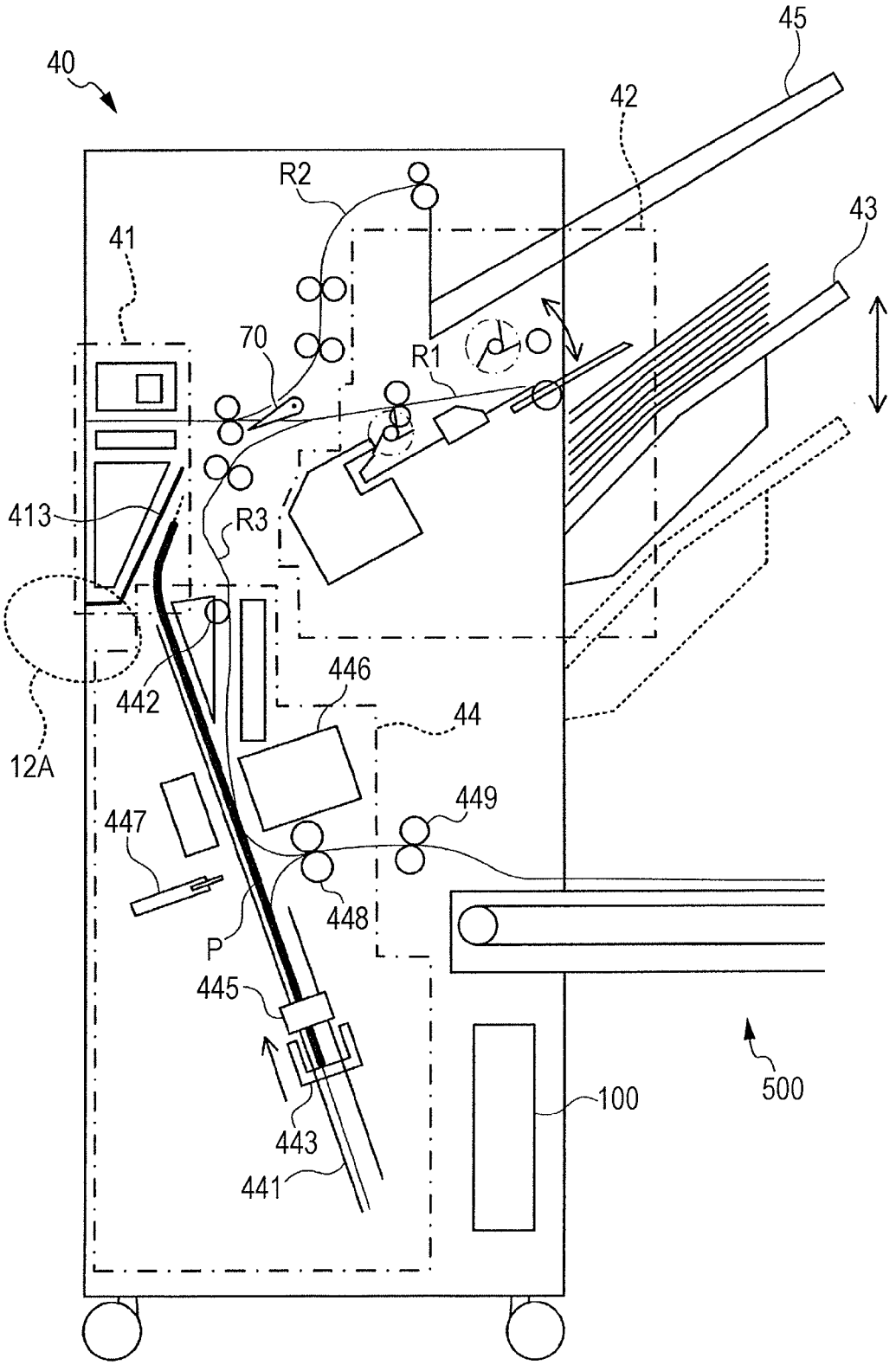

40
45
42
43
41
R2
70
R1
413
R3
442
446
44
12A
447
449
448
P
445
443
441
100
500

FIG. 13

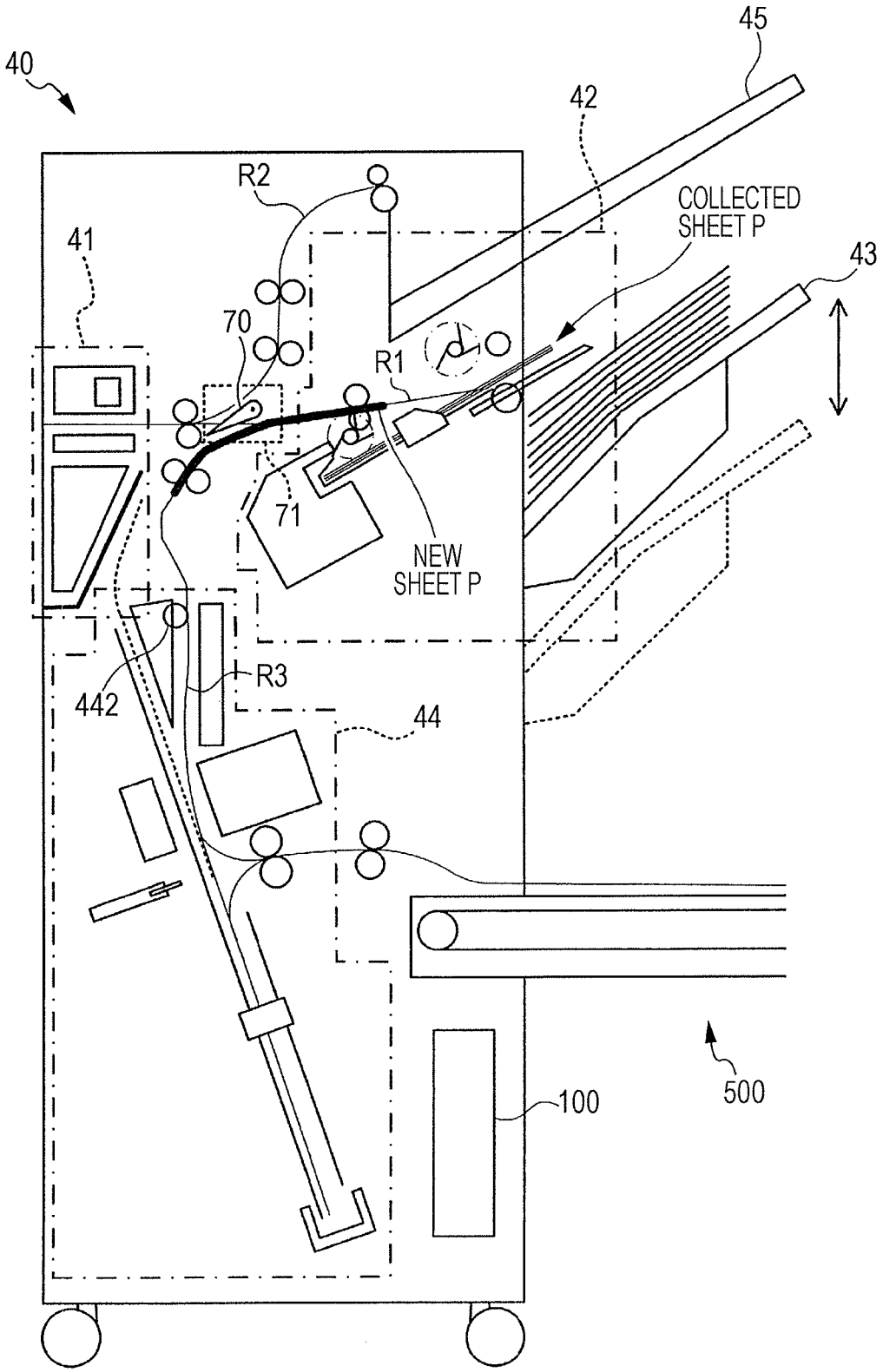
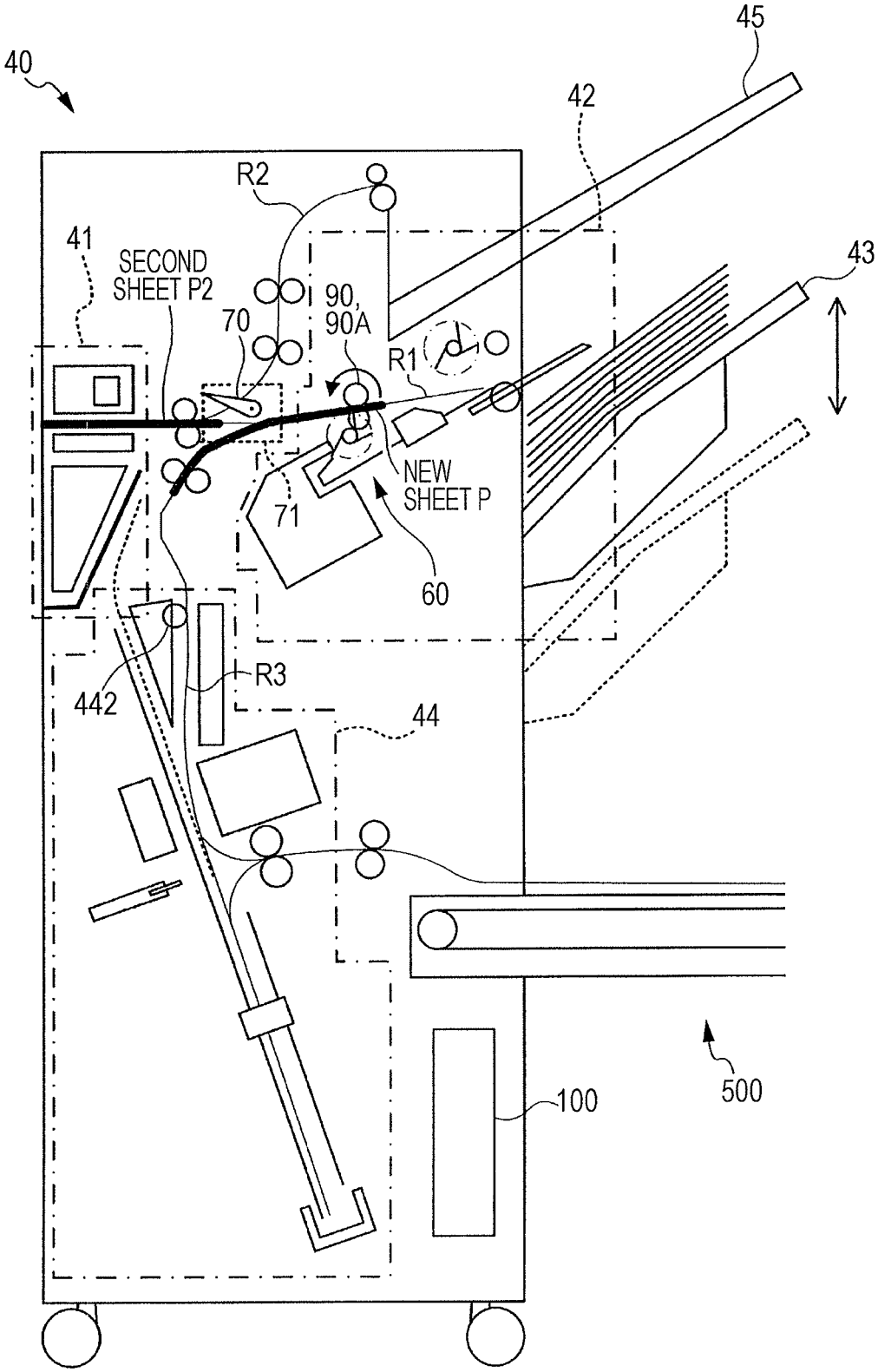

40
45
42
R2
41
COLLECTED SHEET P
43
70
R1
71
NEW SHEET P
442
R3
44
100
500

FIG. 14


40
45
42
R2
41
SECOND
SHEET P2
70
90,
90A
R1
43
NEW
SHEET P
71
60
442
R3
44
100
500

RECORDING MATERIAL PROCESSING APPARATUS AND IMAGE FORMING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2012-281655 filed Dec. 25, 2012.

BACKGROUND

Technical Field

The present invention relates to recording-material processing apparatuses and image forming systems.

SUMMARY

According to an aspect of the invention, there is provided a recording-material processing apparatus including a biding mechanism that moves along a predetermined movement path and binds a recording material stack; a recording-material transport path along which the recording material is transported, the recording-material transport path extending from a first area to a second area, the first area and the second area being next to each other with the movement path therebetween, and extending beside the movement path; a first transport member that is provided in the first area, at a position away from the portion of the recording-material transport path extending beside the movement path, to transport the recording material on the recording-material transport path to the second area; and a second transport member that is provided in the second area, at a position away from the portion of the recording-material transport path extending beside the movement path, to transport the recording material transported by the first transport member to the further downstream side.

According to this aspect of the invention, the size of the recording-material processing apparatus including the biding mechanism, which binds a recording material stack, and the recording-material transport path, along which the recording material is transported, may be reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

An exemplary embodiment of the present invention will be described in detail based on the following figures, wherein:

FIG. **1** illustrates the overall configuration of an image forming system according to an exemplary embodiment;

FIG. **2** is a diagram for explaining the configuration of a first post-processing unit;

FIG. **3** illustrates the movement of a stapler head when a sheet collecting portion is viewed from above;

FIG. **4** is an enlarged view of an upper part of the first post-processing unit;

FIG. **5** is a diagram for explaining a sheet guide member;

FIG. **6** illustrates an exemplary arrangement of the sheet guide member;

FIG. **7** is a diagram for explaining the movement when a sheet is transported to a second stack portion;

FIG. **8** is a diagram for explaining the movement when a sheet is transported to a side-stitch stapler unit;

FIG. **9** is a diagram for explaining the movement when a sheet is transported to a saddle-stitch unit;

FIG. **10** is a diagram for explaining the movement when a sheet is transported to the saddle-stitch unit;

FIG. **11** is a diagram for explaining the movement when a sheet is transported to the saddle-stitch unit;

FIG. **12** illustrates an example of transporting a sheet stack;

FIG. **13** is a diagram for explaining an operation performed when the trailing end of a sheet is retracted from a first sheet-transport path; and

FIG. **14** is a diagram for explaining an operation performed when the trailing end of a sheet is retracted from the first sheet-transport path.

DETAILED DESCRIPTION

An exemplary embodiment of the present invention will be described in detail with reference to the attached drawings. FIG. **1** illustrates the overall configuration of an image forming system according to this exemplary embodiment. The image forming system **1** illustrated in FIG. **1** includes an image forming apparatus **2** that uses, for example, an electrophotographic system to form a color toner image on a sheet P, which is an example of a recording material; and a sheet processing apparatus **3** that performs predetermined processing on the sheet P having the toner image formed thereon with the image forming apparatus **2**. Although the image forming apparatus **2** according to this exemplary embodiment uses an electrophotographic system to form an image, the image forming apparatus **2** may be, for example, an ink jet printer.

The sheet processing apparatus **3** includes a transport unit **10** that transports a sheet P output from the image forming apparatus **2** to a further downstream side; a slip-sheet supplying unit **20** that supplies a slip sheet, such as a cardboard sheet or a windowed sheet, to the sheet P transported by the transport unit **10**; a folding unit **30** that folds the sheet P transported from the transport unit **10** (e.g., C folding and Z folding); a first post-processing unit **40** provided downstream of the folding unit **30** to perform processing, such as perforation, side stitching, or saddle stitching, on the sheet P; a second post-processing unit **500** provided downstream of the first post-processing unit **40** to perform extra processing on a half-folded, saddle-stitched sheet stack P (book); and a controller **100** that is formed of central processing unit (CPU) controlled by a program and controls the overall sheet processing apparatus **3**.

As illustrated in FIG. **1**, the first post-processing unit **40**, which is an example of a recording-material processing apparatus, includes a perforation unit **41** that perforates (punches) a sheet P; a side-stitch stapler unit **42** that binds an end of a sheet stack P; a first stack portion **43** on which side-stitched sheet stacks P are piled up to allow a user to easily take them up; a saddle-stitch unit **44** that folds a sheet stack P in half and binds the sheet stack at the center to form a double-spread book; and a second stack portion **45** on which sheets P that are not processed by the first post-processing unit **40** or that are just perforated are stacked.

FIG. **2** is a diagram for explaining the configuration of the first post-processing unit **40**. As illustrated in FIG. **2**, the first post-processing unit **40** has an introduction port **49** from which a sheet P transported from the folding unit **30** is introduced, and a first sheet-transport path R**1** extending from the introduction port **49** to the side-stitch stapler unit **42**. The first sheet-transport path R**1** transports the sheet P introduced from the introduction port **49** to the side-stitch stapler unit **42**.

The first post-processing unit **40** also has a second sheet-transport path R**2** that is split off from the first sheet-transport path R**1** at a first split portion B**1** and transports the sheet P to the second stack portion **45**, and a third sheet-transport path

R3 that is split off from the first sheet-transport path R1 at a second split portion B2 and transports the sheet P to the saddle-stitch unit **44**. In this exemplary embodiment, the second split portion B2 is located downstream of the first split portion B1 in a sheet-transport direction in the first sheet-transport path R1.

In this exemplary embodiment, a switching gate **70**, which is an example of a switching member, is provided. The switching gate **70** is disposed between the first split portion B1 and the second split portion B2 and switches (sets) the sheet-transportation destination among the first sheet-transport path R1 to the third sheet-transport path R3. This switching gate **70** projects above the first sheet-transport path R1, at a predetermined position downstream of the first split portion B1 and upstream of the second split portion B2. Thus, the switching gate **70** guides the sheet P transported downstream along the first sheet-transport path R1 to the second sheet-transport path R2 and guides the sheet P transported upstream along the first sheet-transport path R1 to the third sheet-transport path R3 (a detailed description will be given below).

The switching gate **70** has a first guide surface **75** and a second guide surface **76**, which is on the other side of the first guide surface **75**. A sheet P transported downstream along the first sheet-transport path R1 is guided to the second sheet-transport path R2 by the first guide surface **75**, and a sheet P transported upstream along the first sheet-transport path R1 is guided to the third sheet-transport path R3 by the second guide surface **76** (a detailed description will be given below). The switching gate **70** is retractable from the first sheet-transport path R1. When a sheet P is transported to the side-stitch stapler unit **42**, the switching gate **70** is retracted from the first sheet-transport path R1.

In this exemplary embodiment, a gate driving mechanism **71** having a motor to drive the switching gate **70** is provided. Transport rollers **90**, each including a pair of rotatable roller members, are provided on the first sheet-transport path R1 to the third sheet-transport path R3 to transport the sheet P on the sheet-transport paths. Furthermore, although not shown in FIG. **2**, sheet guide members that extend along the first sheet-transport path R1 to the third sheet-transport path R3 to guide the sheet P transported along these sheet-transport paths are arranged beside the first sheet-transport path R1 to the third sheet-transport path R3.

The perforation unit **41** is provided next to the introduction port **49** and perforates (punches) a sheet P transported to the first post-processing unit **40** to make some (e.g., two, four, etc.) holes. The perforation unit **41** has a unit body **411** that has a perforating blade to make some (e.g., two, four, etc.) holes in the sheet P, and a container **412** disposed below the unit body **411** to store punching waste resulting from the perforation performed by the unit body **411**. The perforation unit **41** also has a partition wall **413** provided between the container **412** and the inside of the first post-processing unit **40** to partition the area where the container **412** is disposed and the inside of the first post-processing unit **40**.

Next, the side-stitch stapler unit **42** will be described. The side-stitch stapler unit **42** includes a sheet collecting portion **60** that has a support plate **67**, which is obliquely disposed and supports sheets P from below, and collects a necessary number of sheets P to form a sheet stack P; a binding portion **50** that binds an end of the sheet stack P, formed by the sheet collecting portion **60**, with a staple (side stitch); a transport roller **61** that transports the sheet stack P, formed by the sheet collecting portion **60**, to the first stack portion **43**; and a movable roller **62** that may be moved to a position retracted from the transport roller **61** and to a position where it is pressed against the transport roller **61**.

When the side-stitch stapler unit **42** performs processing, first, the sheet P transported from the folding unit **30** (see FIG. **1**) is introduced from the introduction port **49**. Then, the sheet P is transported along the first sheet-transport path R1 to the side-stitch stapler unit **42**. The sheet P is transported to a position above the support plate **67** and is dropped onto the support plate **67**. The sheet P is supported by the support plate **67** from below and slides on the support plate **67** due to the inclination of the support plate **67**.

Then, the sheet P comes into contact with end guides **64** attached to an end of the support plate **67**. More specifically, in this exemplary embodiment, the end guides **64** extending upward in FIG. **2** are provided at the end of the support plate **67**. The sheet P slides on the support plate **67** and comes into contact with the end guides **64**. Thus, in this exemplary embodiment, the movement of the sheet P is stopped. This operation is performed every time a sheet P is transported from the upstream side, and a sheet stack P, in which the trailing ends of sheets P are aligned, is formed on the support plate **67**.

In this exemplary embodiment, a rotary paddle **63** that moves the sheet P on the support plate **67** to the end guides **64** is provided. The sheet P moves to the end guides **64** due to the inclination of the support plate **67** and the rotary paddle **63**. Furthermore, in this exemplary embodiment, sheet-width-position adjusting members **65** that adjust the position of the sheet stack P in the width direction are provided. In this exemplary embodiment, each time the sheet P is supplied onto the support plate **67**, ends (side portions) of the sheet P in the width direction are pressed by the sheet-width-position adjusting members **65** so that the positions, in the width direction, of the sheet P (sheet stack P) are adjusted.

Once a predetermined number of sheets P are stacked on the support plate **67**, an end of the sheet stack P is stapled by a stapler head **51** provided in the binding portion **50**. The stapler head **51** performs stapling by inserting a metal staple (a U-shaped wire) into the sheet stack P. Then, in this exemplary embodiment, the movable roller **62** advances toward the transport roller **61** to pinch the sheet stack P between the movable roller **62** and the transport roller **61**. Then, the transport roller **61** is rotated to transport the sheet stack P to the first stack portion **43**.

As illustrated in FIG. **3**, which shows the movement of the stapler head **51** when the sheet collecting portion **60** is viewed from above, the stapler head **51**, which is an example of a biding mechanism, is movable toward the far side and the near side of the first post-processing unit **40** in FIG. **3** (i.e., is movable from the near side to the far side of the first post-processing unit **40** in FIG. **3**, along a predetermined movement path **3**A). In this exemplary embodiment, the sheets P may be bound at several positions. More specifically, in this exemplary embodiment, the stapler head **51** moves in a depth direction of the first post-processing unit **40**, which is a direction perpendicular to the sheet-transport direction (sheet-stack-transport direction), and binds the sheet stack P at several different positions.

Furthermore, as illustrated in FIG. **3**, the stapler head **51** according to this exemplary embodiment stops at, for example, two different positions (position (A) and position (B) in FIG. **3**) in the depth direction of the first post-processing unit **40** and performs binding at the two positions (two-point side stitch). The stapler head **51** also stops at, for example, an end of the sheet stack P (a corner of the sheet stack P: position (D) in FIG. **3**) and performs binding (one-point side stitch).

The stapler head **51** stops at, for example, the other end of the sheet stack P (the other corner of the sheet stack P: posi-

tion (C) in FIG. **3**) and performs binding (one-point side stitch). In this exemplary embodiment, the stapler head **51** moves in a straight line between position (A) and position (B). The stapler head **51** moves with an angle of rotation of, for example, 45°, between position (A) and position (C) and between position (B) and position (D).

As illustrated in FIG. **3**, in this exemplary embodiment, several end guides **64** are provided. The end guides **64** are arranged at different positions in the depth direction of the first post-processing unit **40** (the direction perpendicular to the sheet-transport direction). As illustrated in FIG. **3**, the end guides **64** each include a restriction portion **641** that is perpendicular to the support plate **67** and that receives ends of sheets P to restrict the movement of the sheets P, and a facing plate **642** that is connected to the restriction portion **641** and faces the support plate **67**. In this exemplary embodiment, when the sheets P are stacked on the support plate **67**, the ends of the sheets P enter a space between the facing plate **642** and the support plate **67** and come into contact with the restriction portion **641**. Thus, the sheets P are aligned.

When the stapler head **51** performs binding at position (A) in FIG. **3**, binding is performed in a space between the facing plate **642** located at the center (in the top-bottom direction) and the facing plate **642** located at the lower part in FIG. **3**. When the stapler head **51** performs binding at position (B) in FIG. **3**, binding is performed in a space between the facing plate **642** located at the center and the facing plate **642** located at the upper part in FIG. **3**.

Next, referring back to FIG. **2**, the saddle-stitch unit **44** will be described. As illustrated in FIG. **2**, the saddle-stitch unit **44** includes a sheet collecting portion **441** that is inclined with respect to the perpendicular direction and functions as a part of a recording-material-stack forming unit that forms a sheet stack P by collecting a necessary number of sheets P after image formation; an output roller **442** for outputting the sheet P, transported via the third sheet-transport path R**3**, onto the sheet collecting portion **441**; an end guide **443** that moves along the sheet collecting portion **441** to determine the saddle-stitch position or the half-folding position; and sheet alignment members (not shown) that transport the sheets P collected in the sheet collecting portion **441** toward the end guide **443**. The sheet alignment members are formed of rotating paddles.

The saddle-stitch unit **44** further includes a sheet-width alignment member **445** formed of a pair of matching plates that are slid to align the sheets P collected in the sheet collecting portion **441** in the width direction; a stapler **446** that performs saddle-stitching on the sheet stack P collected in the sheet collecting portion **441**; a folding knife **447** that advances from the back to the front of the sheet collecting portion **441** to fold, at the center, the sheet stack P, which has been saddle-stitched by the stapler **446**; folding rollers **448** including a pair of rollers that nip the sheet stack P, which begins to be folded by the folding knife **447**, therebetween; and transport rollers **449** that transport the sheet stack P, nipped between the folding rollers **448**, to the second post-processing unit **500**.

When a half-folded, saddle-stitched book is produced in the first post-processing unit **40**, first, the introduction port **49** receives a sheet P. This sheet P is transported along the first sheet-transport path R**1** until the trailing end of the sheet P reaches the switching gate **70**. At this time, the switching gate **70** is arranged to guide the sheet P to the first sheet-transport path R**1** (side-stitch stapler unit **42**). After the trailing end of the sheet P reaches the switching gate **70**, transportation of the sheet P is temporarily stopped.

Then, the switching gate **70** is driven to press the trailing end of the sheet P from the side, and the trailing end of the sheet P enters the third sheet-transport path R**3**. Then, reverse rotation of the transport rollers **90** (transport rollers **90**A: hereinbelow, "forward-reverse rollers **90**A") is started. As a result, the sheet P starts to be transported along the third sheet-transport path R**3** and is guided to the output roller **442** provided in the saddle-stitch unit **44**. Then, the sheet P is sent to the sheet collecting portion **441** by the output roller **442**. This operation is repeated every time a new sheet P is transported.

As a result, a predetermined number (e.g., five, ten, and fifteen) of sheets set in, for example, the controller of the image forming apparatus **2** (not shown) are collected in the sheet collecting portion **441**. When the sheets P are collected in the sheet collecting portion **441**, the sheet alignment members (not shown) are rotated to press the collected sheets P against the end guide **443**, thereby helping sheet alignment. The sheet-width alignment member **445** slides in the width direction of the sheets P collected in the sheet collecting portion **441** to align the collected sheets P in the width direction.

Depending on the size of the sheets P, after a predetermined number of sheets P are collected in the sheet collecting portion **441**, the end guide **443** moves upward to position the middle portion of the sheets P (the sheet stack P) at the staple position of the stapler **446**. At this time, although the sheet stack P brought upward by the end guide **443** moves upward along the sheet collecting portion **441**, when the sheet stack P is long, the sheet stack P moves along a dashed line **3**A in FIG. **2**.

In this case, the leading end of the sheet stack P may come into contact with the perforation unit **41**, and the movement of the sheet stack P may be restricted. However, in this exemplary embodiment, owing to the partition wall **413** provided in the perforation unit **41**, the sheet stack P is guided to the path beside the perforation unit **41**, and the movement of the sheet stack P is not restricted. The partition wall **413** may be omitted, and the sheet stack P may be guided to the path beside the perforation unit **41** with the side surface of the container **412**.

When the middle portion of the sheet stack P reaches the staple position of the stapler **446**, saddle-stitching is performed on the sheet stack P by the stapler **446**. Next due to the end guide **443** moving downward, the saddle-stitched sheet stack P is moved such that the folded part (the middle portion of the sheet stack P) is aligned with the tip of the folding knife **447**. The folding knife **447** is retracted behind the sheet collecting portion **441** while the sheets are collected in the sheet collecting portion **441**, the stapler **446** are performing the saddle-stitching, and the sheets are transported after the saddle-stitching.

After the folded portion of the sheet stack P is moved to the position of the tip of the folding knife **447**, the folding knife **447** is pushed from the back to the front of the sheet collecting portion **441**. The folding knife **447** projects toward the front of the sheet collecting portion **441** through an opening (not shown) provided in the sheet collecting portion **441**. Because of this, the middle portion of the sheet stack P is pushed toward the folding rollers **448** and is nipped between the folding rollers **448**. Then, the sheet stack P is transported downstream by the folding rollers **448** and is transferred to the transport rollers **449**. Then, the half-folded and saddle-stitched sheet stack P is delivered to the second post-processing unit **500** by the transport rollers **449**.

Although binding with the side-stitch stapler unit **42** and half-folding and saddle-stitching with the saddle-stitch unit

44 have been described in the description above, a sheet P that is not subjected to such processing (i.e., a sheet P that is not processed in the first post-processing unit **40**) or a sheet P that is just perforated by the perforation unit **41** is guided to the first guide surface **75** of the switching gate **70** by the second sheet-transport path R**2** and is stacked on the second stack portion **45**.

Referring to FIG. **4** (an enlarged view of the upper part of the first post-processing unit **40**), the first post-processing unit **40** will be further described. The support plate **67** provided in the sheet collecting portion **60** is disposed at an angle of 30° with respect to the horizontal plane (not shown). Furthermore, in this exemplary embodiment, the sheet collecting portion **441** provided in the saddle-stitch unit **44** is disposed at an angle of 20° to 30° with respect to the vertical surface (not shown: a surface extending in the perpendicular direction). Thus, in this exemplary embodiment, the support plate **67** and the sheet collecting portion **441** are arranged perpendicular to each other. When the support plate **67** and the sheet collecting portion **441** are arranged perpendicular to each other like this, a wasted space is reduced compared with the case where the support plate **67** and the sheet collecting portion **441** are not perpendicular to each other, and hence, the size of the first post-processing unit **40** is reduced.

Now, the stapler head **51** will be described in detail. As illustrated in FIG. **4**, the stapler head **51** has a rectangular shape in side view. The stapler head **51** includes a top surface **51**A, a bottom surface **51**B, a first side surface **51**C located near the third sheet-transport path R**3**, and a second side surface **51**D facing the first side surface **51**C. An oblique surface **51**E that meets the top surface **51**A and the first side surface **51**C is provided at a position where the top surface **51**A is to meet the first side surface **51**C.

In this exemplary embodiment, by arranging the third sheet-transport path R**3** near the outer surface of the stapler head **51** as much as possible, a wasted space between the third sheet-transport path R**3** and the stapler head **51** is reduced, thereby achieving a reduction in size of the first post-processing unit **40**. Furthermore, by arranging the third sheet-transport path R**3** along the outer surface of the stapler head **51**, the size of the first post-processing unit **40** is reduced. If the third sheet-transport path R**3** is not arranged along the outer surface of the stapler head **51**, and a part of the third sheet-transport path R**3** is located away from the outer surface of the stapler head **51**, a wasted space may be produced, making it difficult to reduce the size of the first post-processing unit **40**.

More specifically, in this exemplary embodiment, as illustrated in FIG. **4**, a first straight path R**31** extending straight from the second split portion B**2** toward the downstream side is provided in the third sheet-transport path R**3**. The first straight path R**31** is provided along the top surface **51**A of the stapler head **51**. More specifically, in this exemplary embodiment, the top surface **51**A of the stapler head **51** moves over the virtual plane as the stapler head **51** moves. The first straight path R**31** is provided along this virtual plane.

Furthermore, in this exemplary embodiment, a second straight path R**32** connected to the first straight path R**31** and extending straight from the joint to the first straight path R**31** toward the downstream side is provided in the third sheet-transport path R**3**. The second straight path R**32** is provided along the oblique surface **51**E of the stapler head **51** (a virtual plane along which the oblique surface **51**E moves). Furthermore, in this exemplary embodiment, a third straight path R**33** extending straight and disposed downstream of the second straight path R**32** is provided in the third sheet-transport path R**3**. The third straight path R**33** is provided along the first side surface **51**C of the stapler head **51** (a virtual plane along which the first side surface **51**C moves).

In this manner, in this exemplary embodiment, the third sheet-transport path R**3** is formed of several straight paths arranged along the outer surface of the stapler head **51**. With this configuration, the space between the stapler head **51** and the third sheet-transport path R**3** is reduced, whereby the size of the first post-processing unit **40** is reduced. Furthermore, in this exemplary embodiment, the part of the third sheet-transport path R**3** surrounding the stapler head **51** is not formed of a curved path, but is formed of several straight paths. Thus, a wasted space, which may be more likely to be produced when the third sheet-transport path R**3** is formed of a curved path, is less likely to be produced.

Next, the sheet guide members will be described in detail. In this exemplary embodiment, as described above, beside the first sheet-transport path R**1** to the third sheet-transport path R**3**, the sheet guide members that guide a sheet P guided along these sheet-transport paths are provided. In this exemplary embodiment, some of the sheet guide members may be moved in a direction away from the sheet-transport paths. This allows a user to access the sheet-transport paths and remove a sheet P stopped due to a paper jam etc.

More specifically, in this exemplary embodiment, as illustrated in FIG. **4**, a part of the sheet guide member provided along the third sheet-transport path R**3** (the sheet guide member denoted by reference numeral **80** in FIG. **4**: hereinbelow, a "sheet guide member **80**") is rotatable about a hinge provided at the far side of the first post-processing unit **40**. By rotating the sheet guide member **80**, an opening is formed, allowing a user to access the third sheet-transport path R**3**. Thus, a sheet P stopped due to a paper jam etc may be removed. Although the first post-processing unit **40** includes several sheet guide members, FIG. **4** illustrates only the sheet guide member **80**. Illustration of the sheet guide members other that the sheet guide member **80** is omitted.

Referring to FIG. **5** (a diagram for explaining the sheet guide member **80**), a more detailed description of the sheet guide member **80** will be given. FIG. **5** illustrates the sheet guide member **80**, the sheet collecting portion **60**, etc., as viewed in an arrow V direction in FIG. **4**. As described above and as illustrated in FIG. **5**, the sheet guide member **80** may be rotated about a hinge **81** disposed at the far side of the first post-processing unit **40**. When the sheet guide member **80** is rotated about the hinge **81** in a direction away from the third sheet-transport path R**3** (third straight path R**33**), an opening is formed at a position denoted by reference numeral **5**A in FIG. **5**. Thus, a user becomes able to access the third sheet-transport path R**3** from the front of the first post-processing unit **40** through this opening.

In this exemplary embodiment, when a paper jam is detected by a sensor (not shown), the stapler head **51** automatically moves to position (B), as indicated by an arrow **5**B in FIG. **5**. Then, the occurrence of a paper jam is notified to the user. Then, the sheet guide member **80** becomes able to be widely opened, providing a wide opening.

In this exemplary embodiment, as described above, a part of the third sheet-transport path R**3** is formed by connecting three straight paths, namely, the first straight path R**31** to the third straight path R**33**. As illustrated in FIG. **4**, as a whole, the part formed of the first straight path R**31** to the third straight path R**33** curves leftward toward the downstream side in the sheet-transport direction. In this exemplary embodiment, the sheet guide member **80** is provided radially inward of the curved portion in the third sheet-transport path R**3**.

As illustrated in FIG. **6** (a diagram showing an exemplary arrangement of the sheet guide member **80**), when sheet guide

members **80** of the same size are provided radially outward and inward of a curved sheet-transport path, typically, the sheet guide member **80** provided radially inward is configured to be openable to increase the area to which the user may access.

More specifically, when the sheet guide member **80** provided radially inward is opened, a user may access an area denoted by reference numeral **6**A in FIG. **6**, whereas when the sheet guide member **80** provided on the radially outer side is opened, the user may access an area denoted by reference numeral **6**B, which is smaller than the area **6**A. Hence, in this exemplary embodiment, as described above, the sheet guide member **80** is provided radially inward of the curved portion of the third sheet-transport path R**3** to increase the area to which the user may access.

Furthermore, in this exemplary embodiment, as described above, the third straight path R**33** (see FIG. **4**) is provided along the first side surface **51**C of the stapler head **51**. This configuration further increases the size of the opening formed due to the sheet guide member **80** being rotated in this exemplary embodiment.

For example, if the third straight path R**33** is not straight but is curved so as to be convex toward the stapler head **51**, or if the third straight path R**33** is not arranged along the first side surface **51**C, as indicated by dashed line **4**A in FIG. **4**, the angle of rotation of the sheet guide member **80** is small, so the opening is also small. Although the size of the opening may be increased by increasing the distance between the third straight path R**33** and the stapler head **51**, this may make it difficult to reduce the size of the first post-processing unit **40**. In contrast, when the third straight path R**33** having a straight shape is arranged along the first side surface **51**C as in this exemplary embodiment, the size of the opening may be increased while reducing the size of the first post-processing unit **40**.

Furthermore, in this exemplary embodiment, when the sheet guide member **80** is operated by the user, the stapler head **51** is located at position (B) in FIG. **5**. As a result, in this exemplary embodiment, a space for opening the sheet guide member **80** is produced in the first post-processing unit **40**. Usually, nothing is disposed in the path of the stapler head **51**, so a wasted space is produced. However, in this exemplary embodiment, the sheet guide member **80** is opened in the path of the stapler head **51** and reaches the path of the stapler head **51** to utilize the wasted space. Thus, the size of the first post-processing unit **40** is further reduced.

In this exemplary embodiment, a sheet guide member (not shown) that moves in a direction away from the second sheet-transport path R**2** is provided in an area **4**B in FIG. **4**. The sheet P on the second sheet-transport path R**2** may be removed also in this area. In this exemplary embodiment, when a sheet P is jammed at a position downstream of the sheet guide member **80** or at a position downstream of the area **4**B, the jammed sheet P is transported to the sheet guide member **80** or to the area **4**B.

More specifically, paper jam is often caused due to the leading end of a sheet P interfering with something, and even when paper jam occurs, the sheet P is often able to be transported to the upstream side. Hence, in this exemplary embodiment, as described above, when a sheet P is jammed at a position downstream of the sheet guide member **80** or at a position downstream of the area **4**B, this sheet P is transported to the sheet guide member **80** or to the area **4**B. Then, this sheet P is removed by a user.

Referring back to FIG. **4**, the first post-processing unit **40** will be further described. In this exemplary embodiment, in order to reduce the size of the first post-processing unit **40**, the transport rollers **90** are also provided at positions contributing to a reduction in size of the first post-processing unit **40**. More specifically, the transport rollers **90** are disposed at a position away from a facing area that faces the top surface **51**A of the stapler head **51** (a virtual plane along which the top surface **51**A moves). More specifically, the transport rollers **90** are disposed at a position away from an area located between a virtual plane extending from the first side surface **51**C (a plane **4**E) and a virtual plane extending from the second side surface **51**D (a plane **4**F).

More specifically, first, the forward-reverse rollers **90**A are disposed at a position away from the facing area. Furthermore, the forward-reverse rollers **90**A are disposed downstream of the facing area in the sheet-transport direction in the first sheet-transport path R**1**. Furthermore, in this exemplary embodiment, the transport rollers **90** disposed in the third sheet-transport path R**3**, at a position between the switching gate **70** and the output roller **442**, (hereinbelow, a "third-path transport rollers **90**B") are also provided at a position away from the facing area. More specifically, the third-path transport rollers **90**B are disposed downstream of the facing area in the sheet-transport direction in the third sheet-transport path R**3**.

Furthermore, in this exemplary embodiment, the sheet-transport path along which the sheet P is transported when the sheet P is transported to the saddle-stitch unit **44** (i.e., the sheet-transport path located between the forward-reverse rollers **90**A and the saddle-stitch unit **44**; hereinbelow also referred to as a "saddle-stitch path") is formed so as to extend from an area **3**B to an area **3**C in FIG. **3**, which face each other with the movement path **3**A therebetween (see FIG. **3**). Furthermore, this saddle-stitch path is provided beside the movement path **3**A, along which the stapler head **51** moves (in FIG. **4**, a portion located between the plane **4**E and the plane **4**F).

In this exemplary embodiment, the forward-reverse rollers **90**A, which serve as the first transport member, are disposed in the area **3**B, and the third-path transport rollers **90**B, which serve as the second transport member, are disposed in the area **3**C. Furthermore, in this exemplary embodiment, the forward-reverse rollers **90**A and the third-path transport rollers **90**B are provided at portions different from the above-mentioned position provided beside the movement path **3**A in the saddle-stitch path (i.e., the portion located between the plane **4**E and the plane **4**F in FIG. **4**).

As has been described, in this exemplary embodiment, the transport rollers **90** are provided at a position away from the facing area that faces the top surface **51**A of the stapler head **51**. Hence, in this exemplary embodiment, a part of the first sheet-transport path R**1** (the part between the second split portion B**2** and the forward-reverse rollers **90**A) may be disposed near the top surface **51**A of the stapler head **51**, and a part of the third sheet-transport path R**3** (the part between the second split portion B**2** and the third-path transport rollers **90**B) may be disposed near the top surface **51**A of the stapler head **51**. More specifically, a part of the saddle-stitch path may be disposed near the top surface **51**A of the stapler head **51**. In this case, the size of the first post-processing unit **40** may be further reduced.

When the transport rollers **90** are provided in the facing area, in order to avoid interference between the transport rollers **90** and the stapler head **51**, the transport rollers **90** have to be provided at a position away from the stapler head **51**. In such a case, the distance between the top surface **51**A of the stapler head **51** and the sheet-transport paths (first sheet-transport path R**1** and the third sheet-transport path R**3**) is larger than that illustrated in FIG. **4**, leading to an increase in size of the first post-processing unit **40**.

Furthermore, in this exemplary embodiment, because the sheet-transport path may be provided near the top surface **51**A of the stapler head **51**, a space is produced in an opposite area of the sheet-transport path from the stapler head **51** (area **4**C in FIG. **4**). In this exemplary embodiment, the switching gate **70** is disposed in this area. More specifically, in this exemplary embodiment, as described above, the saddle-stitch path extends beside the movement path **3**A, along which the stapler head **51** moves. Furthermore, in this exemplary embodiment, the switching gate **70** is provided on the opposite side of the part of the saddle-stitch path extending beside the movement path **3**A from the movement path **3**A. Accordingly, in this exemplary embodiment, the limited space in the first post-processing unit **40** is further efficiently used, and the size of the first post-processing unit **40** is further reduced.

Now, the movement of the first post-processing unit **40** will be described. First, referring to FIG. **7**, which illustrates the movement when a sheet P is transported to the second stack portion **45**, movements of the respective parts when the sheet P is transported to the second stack portion **45** will be described. As described above, a sheet P that is not processed in the first post-processing unit **40** or a sheet P that is only perforated in the perforation unit **41** is guided to the second sheet-transport path R**2** by the first guide surface **75** of the switching gate **70** and is stacked on the second stack portion **45**. In this case, as illustrated in FIG. **7**, the switching gate **70** is arranged so as to cross the first sheet-transport path R**1**. The sheet P transported from the upstream side along the first sheet-transport path R**1** is guided to the second sheet-transport path R**2**. Then, the sheet P is stacked on the second stack portion **45**.

Next, referring to FIG. **8**, which illustrates the movement when a sheet P is transported to the side-stitch stapler unit **42**, movements of the respective parts when the sheet P is transported to the side-stitch stapler unit **42** will be described. When a sheet P is transported to the side-stitch stapler unit **42**, as illustrated in FIG. **8**, the switching gate **70** is retracted from the first sheet-transport path R**1**. In this case, the sheet P transported to the switching gate **70** along the first sheet-transport path R**1** passes through a portion where the switching gate **70** is provided (a position where the switching gate **70** projects) and is further transported along the first sheet-transport path R**1**. Then, the sheet P reaches the side-stitch stapler unit **42**.

Next, referring to FIGS. **9** to **11**, which illustrate the movement when a sheet P is transported to the saddle-stitch unit **44**, movements of the respective parts when the sheet P is transported to the saddle-stitch unit **44** will be described. When a sheet P is transported to the saddle-stitch unit **44**, the sheet P is received by the introduction port **49** and is transported along the first sheet-transport path R**1**. At this time, as illustrated in FIG. **9**, the switching gate **70** is retracted from the first sheet-transport path R**1**. Then, as illustrated in FIG. **9**, the sheet P is transported until the trailing end of the sheet P reaches the switching gate **70**. After the trailing end of the sheet P reaches the switching gate **70**, transportation of the sheet P is temporarily stopped.

Next, the gate driving mechanism **71** is driven, and as illustrated in FIG. **10**, the switching gate **70** is arranged so as to cross the first sheet-transport path R**1**. As a result, the trailing end of the sheet P is pressed from the side by the second guide surface **76** of the switching gate **70** and enters the third sheet-transport path R**3**. Then, reverse rotation of the forward-reverse rollers **90**A is started. As a result, the sheet P transported along the first sheet-transport path R**1** in one direction is transported in the opposite direction, is guided by the second guide surface **76** of the switching gate **70**, and is sent to the third sheet-transport path R**3**, as illustrated in FIG. **11**. Then, the sheet P is transported to the output roller **442** provided in the saddle-stitch unit **44** and is sent to the sheet collecting portion **441** by the output roller **442**.

When the sheet P has been transported to the third sheet-transport path R**3** by the reversely rotating forward-reverse rollers **90**A, the switching gate **70** is retracted from the first sheet-transport path R**1** to allow a next sheet P to pass. When the trailing end of this sheet P reaches the switching gate **70**, in the same way as above, transportation of the sheet P is stopped, and the switching gate **70** is driven. As a result, the trailing end of this sheet P enters the third sheet-transport path R**3**. Then, in the same way as above, reverse rotation of the forward-reverse rollers **90**A is started, and this sheet P is sent to the output roller **442**.

When sheets P are transported to the saddle-stitch unit **44**, sheets P are sequentially transported so that a sheet stack P is formed. In this case, every time a new sheet P is transported, transportation of the sheet P along the first sheet-transport path R**1**, driving of the switching gate **70** (arranging the switching gate **70** so as to cross the first sheet-transport path R**1**), reverse rotation of the forward-reverse rollers **90**A, and retraction of the switching gate **70** from the first sheet-transport path R**1** are performed.

As has been described above, in this exemplary embodiment, when a predetermined number of sheets P have been collected in the sheet collecting portion **441**, the end guide **443**, which serves as a part of a recording-material-stack transport unit, moves upward until the middle portion of the sheet stack P is located at the staple position of the stapler **446**. At this time, the sheet stack P is moved upward by the end guide **443** along the sheet collecting portion **441**. When the sheet stack P is long, as illustrated in FIG. **12**, which illustrates an example of transporting the sheet stack P, the leading end of the sheet stack P advances toward the perforation unit **41**. More specifically, in this exemplary embodiment, the perforation unit **41**, which serves as a perforation-processing unit, is provided in the extension of the path along which the sheet stack P moves upward. When the sheet stack P is long, the leading end of the sheet stack P advances toward the perforation unit **41**.

In this case, as described above, the leading end of the sheet stack P may come into contact with the perforation unit **41**, and the movement of the sheet stack P may be restricted. However, in this exemplary embodiment, the partition wall **413** is provided in the perforation unit **41** so as to cross the transport path of the sheet stack P, more specifically, the partition wall **413** is arranged so as to intersect the transport path at an angle other than 90 degrees (i.e., so as to cross the transport path in an oblique direction). Thus, the sheet stack P is guided to the path beside the perforation unit **41**, and the movement of the sheet stack P is not restricted by the perforation unit **41**. The outer surface of the partition wall **413** may be regarded as a guide surface that guides the leading end of the sheet stack P to the path beside the perforation unit **41**.

In this exemplary embodiment, the sheet stack P is guided to a space between the perforation unit **41** and the third sheet-transport path R**3**. More specifically, the sheet stack P is guided such that the leading end thereof is directed to the inside of the first post-processing unit **40**. Although it may be possible to guide the sheet stack P in a direction opposite to the direction where the third sheet-transport path R**3** is provided (a direction denoted by reference numeral **12**A in FIG. **12**, i.e., a direction toward the outside of the first post-processing unit **40**) instead of to the third sheet-transport path R**3**, in such a case, the size of the first post-processing unit **40** has to be increased to prevent the sheet stack P from projecting

from the unit. In contrast, as in this exemplary embodiment, by guiding the sheet P to the space between the perforation unit **41** and the third sheet-transport path R**3**, a wasted space is eliminated, and the size of the first post-processing unit **40** is less likely to increase.

The side-stitch stapler unit **42** collects a predetermined number of sheets P to form a sheet stack P and performs binding on this sheet stack P. This binding takes time. When one or more sheet stacks P (books) are to be produced, new sheets P (sheets P to be used to produce the next book) are transported to the side-stitch stapler unit **42** from the upstream side. That is, while the side-stitch stapler unit **42** is performing binding, new sheets P for producing a new sheet stack P (a new book) are transported thereto. The first post-processing unit **40** according to this exemplary embodiment temporarily retracts the trailing end of the newly transported sheet P from the first sheet-transport path R**1**.

Referring to FIGS. **13** and **14**, which illustrate an operation performed when the trailing end of the sheet P is retracted from the first sheet-transport path R**1**, a more detailed description will be given. When a new sheet P (a sheet P to be used to produce a next book: hereinbelow, a "new sheet P") is transported from the upstream side, first, the new sheet P is transported along the first sheet-transport path R**1** until the trailing end thereof reaches the switching gate **70**. At this time, the switching gate **70** is arranged to guide the new sheet P to the first sheet-transport path R**1** (the switching gate **70** is retracted from the first sheet-transport path R**1**).

After the trailing end of the new sheet P reaches the switching gate **70**, transportation of the new sheet P is temporarily stopped, and the switching gate **70** is driven. As a result, as described above, the trailing end of the new sheet P enters the third sheet-transport path R**3**. Then, reverse rotation of the forward-reverse rollers **90**A is started. As a result, as illustrated in FIG. **13**, the trailing end of the new sheet P is sent to the third sheet-transport path R**3**, and the trailing end of the new sheet P is retracted from the first sheet-transport path R**1**. Next, in this exemplary embodiment, as illustrated in FIG. **14**, the switching gate **70** is retracted from the first sheet-transport path R**1**. Then, as illustrated in FIG. **14**, a second sheet P (hereinbelow, a "second sheet P**2**") is transported from the upstream side. When the leading end of the second sheet P**2** reaches a predetermined position (for example, after the leading end of the second sheet P**2** passes through the switching gate **70**), forward rotation of the forward-reverse rollers **90**A is started. As a result, the new sheet P that has been temporarily sent to the third sheet-transport path R**3** and the second sheet P**2**, laid on top of each other, are supplied to the sheet collecting portion **60**. At this time, the preliminarily produced book (sheet stack P) is output, and no sheet P is on the sheet collecting portion **60**.

When this processing is to be performed, transportation of the second sheet P**2** does not need to be stopped. If transportation of the second sheet P**2** is stopped, a sheet P following the second sheet P**2** also needs to be stopped. Hence, the image forming operation in the image forming apparatus **2** (see FIG. **1**) also needs to be stopped. In such a case, the number of sheets P printed per unit time decreases, lowering productivity. On the other hand, if the above-described processing is performed, transportation of the second sheet P**2** does not need to be stopped, whereby lowering of productivity is suppressed.

If a new sheet P is simply made to stand-by on the first sheet-transport path R**1**, and forward rotation of the forward-reverse rollers **90**A is started when the second sheet P**2** is transported to a predetermined position, lowering of productivity may be suppressed. However, if a new sheet P is simply made to stand-by on the first sheet-transport path R**1**, the second sheet P**2** transported thereto may slip under the new sheet P, and the new sheet P and the second sheet P**2** may be stacked in a wrong order. When the trailing end of the new sheet P is retracted from the first sheet-transport path R**1**, as described above, the new sheet P and the second sheet P**2** are stacked in a predetermined order.

Typically, the switching gate **70** is provided for each split portion where the sheet-transport path splits. In the configuration according to this exemplary embodiment, the first split portion B**1** and the second split portion B**2** are provided. Typically, the switching gate **70** is provided for each of the first split portion B**1** and the second split portion B**2**.

On the other hand, in this exemplary embodiment, as described above, switching between the first sheet-transport path R**1** and the second sheet-transport path R**2** and switching between the first sheet-transport path R**1** and the third sheet-transport path R**3** are performed by a single switching gate **70**. Accordingly, in this exemplary embodiment, compared with the case where the switching gate **70** is provided for each of the split portions, the number of parts is reduced, and the manufacturing cost is reduced. Furthermore, because the number of parts is reduced, the size of the apparatus is also reduced.

In this exemplary embodiment, as has been described above with reference to FIG. **10**, the trailing end of the sheet P is pushed from the side by the switching gate **70** to guide the sheet P to the third sheet-transport path R**3**. However, the sheet P may be guided to the third sheet-transport path R**3** by another method.

For example, the sheet P is transported along the first sheet-transport path R**1** until the trailing end of the sheet P passes through the switching gate **70**, and then, the switching gate **70** is driven. More specifically, after the trailing end of the sheet P has completely passed through the position where the switching gate **70** projects into the first sheet-transport path R**1**, the switching gate **70** is projected into the first sheet-transport path R**1**. Then, the forward-reverse rollers **90**A are reversely rotated to transport the sheet P in the opposite direction. In this case, when the switching gate **70** is projected into the first sheet-transport path R**1**, the switching gate **70** does not touch the sheet P, so damage to the sheet P is reduced compared with the case where the sheet P is pressed from the side.

The foregoing description of the exemplary embodiment of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiment was chosen and described in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to understand the invention for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

What is claimed is:

1. A recording-material processing apparatus comprising:

a binding mechanism that moves along a predetermined movement path and binds a recording material stack;

a recording-material transport path along which the recording material is transported, the recording-material transport path extending from a first area to a second area, the first area and the second area being next to each other with the movement path therebetween, and extending beside the movement path;

a first transport member that is provided in the first area, at a position away from the portion of the recording-material transport path extending beside the movement path, to transport the recording material on the recording-material transport path to the second area;

a second transport member that is provided in the second area, at a position away from the portion of the recording-material transport path extending beside the movement path, to transport the recording material transported by the first transport member to the further downstream side;

a switching member that switches transportation destination to which the recording material transported in the recording-material processing apparatus is transported, the switching member being provided downstream of the first transport member and upstream of the second transport member in a recording-material transport direction beside the recording-material transport path, on the opposite side of the portion extending beside the movement path from the movement path; and

a guide member provided beside the recording-material transport path to guide the recording material transported along the recording-material transport path, the guide member comprising a hinge, which allows the guide member to move toward and away from the recording-material transport path.

2. The recording-material processing apparatus according to claim **1**, further comprising:

a recording-material-stack forming unit that collects one or more recording materials transported downstream by the second transport member to form a recording material stack;

a recording-material-stack transport unit that transports the recording material stack formed by the recording-material-stack forming unit along a predetermined path;

a perforation-processing unit that is provided in an extension of the predetermined path and perforates the recording material; and

a guide surface that guides a leading end of the recording material stack, which is transported by the recording-material-stack transport unit along the predetermined path, to the path extending beside the perforation-processing unit when the leading end reaches the perforation-processing unit.

3. The recording-material processing apparatus according to claim **2**,

wherein the guide surface guides the leading end to the inside of the recording-material processing apparatus.

4. An image forming system comprising:

an image forming apparatus that forms an image on a recording material;

a binding mechanism that moves along a predetermined movement path and binds recording materials having images formed thereon by the image forming apparatus;

a recording-material transport path along which the recording materials having images formed thereon by the image forming apparatus are transported, the recording-material transport path extending from a first area to a second area, the first and second areas being next to each other with the movement path therebetween, and extending beside the movement path;

a first transport member that is provided in the first area, at a position away from the portion of the recording-material transport path extending beside the movement path, to transport the recording material on the recording-material transport path to the second area; and

a second transport member that is provided in the second area, at a position away from the portion of the recording-material transport path extending beside the movement path, to transport the recording material transported by the first transport member to the further downstream side;

a switching member that switches transportation destination to which the recording material transported in the recording-material processing apparatus is transported, the switching member being provided downstream of the first transport member and upstream of the second transport member in a recording-material transport direction beside the recording-material transport path, on the opposite side of the portion extending beside the movement path from the movement path; and

a guide member provided beside the recording-material transport path to guide the recording material transported along the recording-material transport path, the guide member comprising a hinge, which allows the guide member to move toward and away from the recording-material transport path.

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